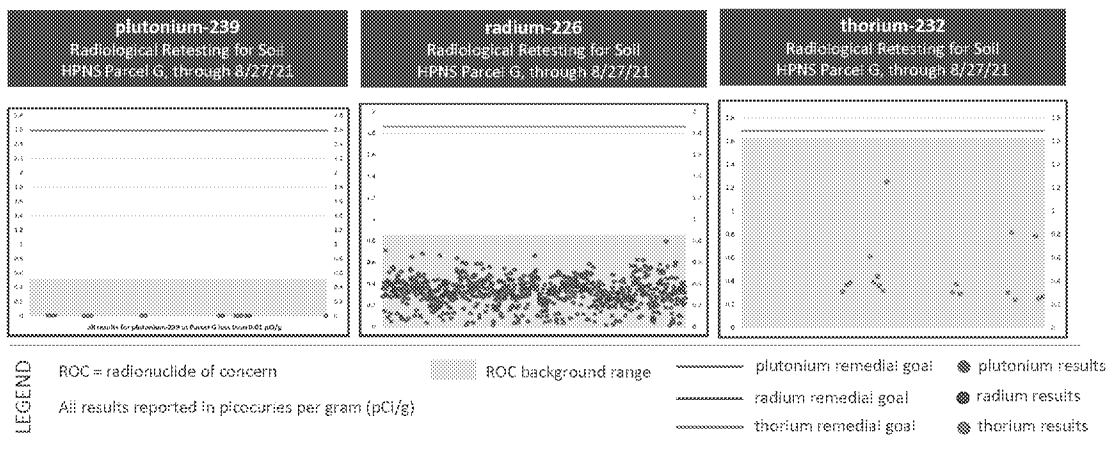


## Radiological Retesting: soil analytical results at Parcel G



- Cesium and radium data collected for all samples at Phase 1 excavations
- Strontium data collected at 10% of samples at all Phase 1 excavations
- Plutonium, thorium, and uranium collected specific locations identified in the work plan



All results Phase 1 soil results received through August 2021 fall below the remedial goal established for each radionuclide of concern.

In addition, initial results for cesium, plutonium, radium, thorium and uranium all fall within the background range.

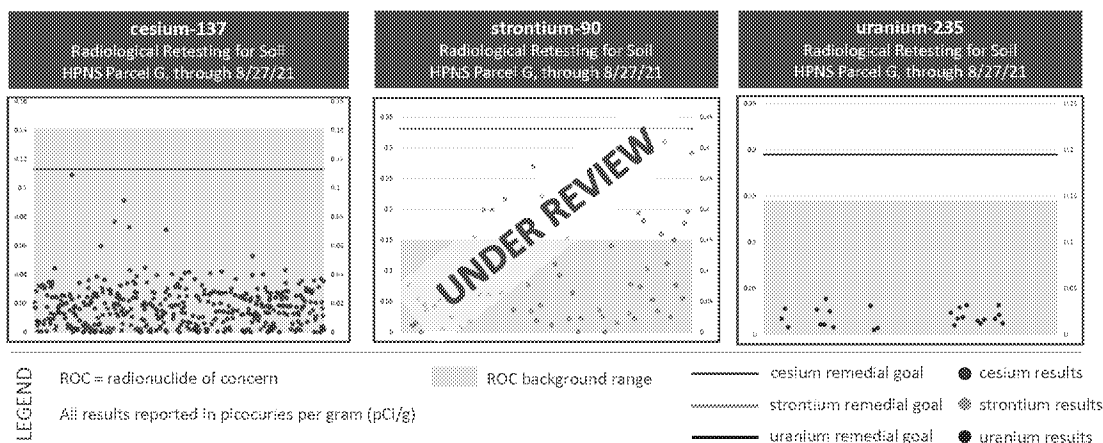
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## Radiological Retesting: soil analytical results at Parcel G



- Cesium and radium data collected for all samples at Phase 1 excavations
- Strontium data collected at 10% of samples at all Phase 1 excavations
- Plutonium, thorium, and uranium collected in specific locations identified in the work plan



The Navy continues to collect new data for six radionuclides of concern at Parcel G, including:

Cesium, radium, and strontium at all excavations

Plutonium, thorium, and uranium at excavations identified as potential locations for those radionuclides of concern

Phase 1 samples are collected from 25 locations at 21 trench units.

After collection, samples are sent to an independent laboratory for analysis.

When analysis is complete, the data is evaluated, and the results are compared to the background results and the remedial goals that were established.

Initial results collected, analyzed, and received for Phase 1 through August 27, 2021 are shown on this slide and the next.

The remedial goal for each radionuclide of concern is shown as a line in the graphs above.

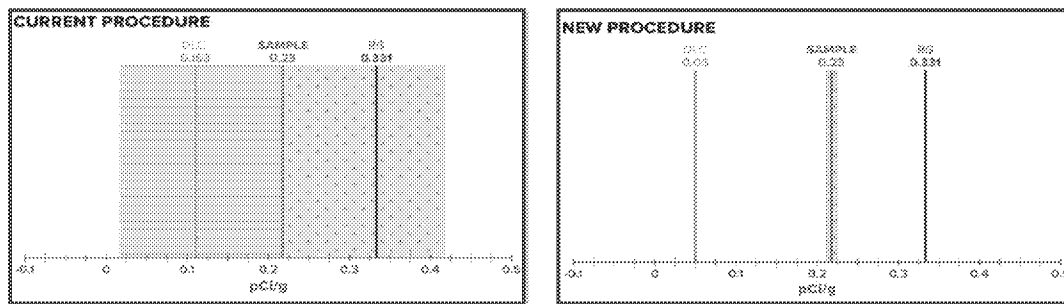
The naturally-occurring background range for each radionuclide is represented by the shaded gray area in each graph.

Data points for soil analytical results for each radionuclide are shown as a circle on each graph.

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# Radiological Retesting at HPNS Measurement Uncertainty (Sr-90)



## LEGEND

DLC = Decision level concentration  
 RG = Remedial goal  
 pCi/g = Picocurie per gram

Negative uncertainty

Positive uncertainty

*DLC and uncertainty for the new procedure are expected and based on previous results for another project site (not HPNS soil). DLC and uncertainty are calculated for each sample and are conceptually shown on this exhibit. Actual DLC and uncertainty may differ from that shown.*

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## Radiological Retesting at HPNS Strontium-90 (Sr-90)



### What are the challenges in evaluating Sr-90 at HPNS?

- Navy remedial goal is very low
  - within regional background
- Measurement uncertainty and detection limits

- Where will the Navy test for Sr-90 at HPNS?
  - 10% of HPNS parcels included in radiological retesting
    - Parcel G trenches (ongoing)
    - Parcel G former building & crawl space survey units (upcoming)
- What are Navy goals for Sr-90 at HPNS?
  - Navy remedial goal (RG): 0.331 pCi/g
  - Navy RG is **very protective**
  - RG is approximately **100 times more protective** than EPA's cancer risk range used to make cleanup decisions
- What is Navy doing to achieve accurate and precise results?
  - Navy is refining the testing method to provide **more precise** results
  - Navy will **re-analyze all Sr-90 samples** previously collected using updated method
  - **Regulatory agencies concur** with selection of more precise method

RISK: RESRAD and PRG evaluation using Navy RGs = Translates into 1/100th (100 times lower) than NCP risk rate [ref: HPS FYR RAD Add for Soil]

From Sr-90 Summary 28 Sept 2021

Chemists and other experts have evaluated a summary of all results to date and determined that the laboratory method is not meeting the Data Quality Objectives of the WP. The current method results in too much uncertainty to meet our low detection limits and therefore we cannot determine if the sample contains strontium are above or below our remedial goal.

PATH FORWARD – alternate approach is more detailed, more rigorous

An alternate approach has been developed that runs the same laboratory method in a way that the data is useable and reliable for this project. Going forward, the laboratory will use a 2.5-gram aliquot for analysis, versus the previous 1 gram for analysis. The lab will use the 14 day ingrowth versus the 7-day ingrowth. If a sample has a Sr-90 result above the RG, the same aliquot will be immediately re-counted to verify the result is re-producible. The new method is more appropriate for low detection limits and should provide a level of uncertainty below the remedial goal even if there is a false positive.

All samples analyzed for strontium will be re-analyzed using the updated method.

The new data set will supersede prior data collected using the old method.

\*\*\*\*\*  
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Other notes:

Sr-90 is an ROC at all sites with SS/SD lines

Exceedances: 23 total samples from 9 TUs

69 (5) 70 (1) 77 (5) 79 (5) 95 (2)

97 (2) 100 (1) 101 (1) 124 (1)

Health information from ATSDR and EPA fact sheets on strontium

<https://www.atsdr.cdc.gov/ToxProfiles/tp159-c1-b.pdf>

<https://semspub.epa.gov/work/HQ/175430.pdf>

<https://www.epa.gov/radiation/radionuclide-basics-strontium-90>

Risk evaluation based on what is baseline hazard at site, what level is achievable, what is planned future use, etc.

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